

INFORMATION PROCESSING APPARATUS AND  
PRINT CONTROL APPARATUS, DATA PROCESSING METHOD,  
STORAGE MEDIUM AND PROGRAM

5 BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an information  
processing apparatus and a pull print printing system  
that are capable of executing a print instruction at  
10 least with respect to an IPP print apparatus via a  
predetermined communication medium, an information  
processing method, a storage medium and a program.

Related Background Art

Currently, a network printing system in which a  
15 plurality of client machines exist is realized.

In addition, in recent years, a printer has begun  
to be introduced into a market that is equipped with  
the Internet Printing Protocol (IPP) provided for by  
RFC as a protocol for Internet printing of a printer.

20 With this IPP, a function of "Print-URI request"  
is provided for. In addition, also provided for is a  
function with which a client issues a "Print-URI  
request" designating a URL to a printer, whereby the  
printer itself obtains and prints data on a Web server  
25 in a URL-designated destination (which is referred to  
as Pull Print). An IPP printer has realized to print  
Web pages in all over the world by this function.

Further, a Printo-URI request that is designated by a URL through an access to a Web or the like may be referred to as a Printo-URL request.

However, under a conventional network print environment, even if an IPP printer exists under a network environment, its function cannot be utilized under a local network environment such as an office, which makes it inconvenient to use the printer.

In addition, if reference information or the like for specifying a storage place of print data such as a URL is not obtained or if reference information corresponding to desired print data is unknown, the IPP printer cannot be utilized.

The present invention aims to improve convenience of use of the IPP printer.

#### SUMMARY OF THE INVENTION

The present invention has been devised in view of these problems. An information processing apparatus in an embodiment of the present invention is an information processing apparatus that is characterized by comprising holding means for holding print data for which a print request is made in order to easily make an IPP printer available under a conventional local area network environment such as an office; generating means for generating reference information for performing pull print corresponding to the print data

held in the holding means; and issuing means for  
issuing the reference information for performing pull  
print corresponding to the print data generated in the  
generating means to a printing apparatus, which is made  
5 communicatable via a predetermined communication medium,  
as a print request.

Alternatively, the information processing  
apparatus is characterized by further comprising a  
printing apparatus having a pull print function;  
10 generating means for generating reference information  
for performing pull print corresponding to print data  
for which a print request is made by the printing  
apparatus; and instructing means for instructing a  
printing apparatus, which is made communicatable via a  
15 predetermined communication medium, to print the  
reference information for performing the pull print  
generated in the generating means.

Other features and advantages of the present  
invention will be apparent from the following  
20 description taken in conjunction with the accompanying  
drawings, in which like reference characters designate  
the same or similar parts throughout the figures  
thereof.

## 25 BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view illustrating a configuration of a  
data processing system, to which an information

processing apparatus is applicable, showing an embodiment of the present invention;

FIG. 2 is a block diagram illustrating a control configuration of a printer shown in FIG. 1;

5        FIG. 3 is a block diagram illustrating a control configuration of the printer shown in FIG. 1;

FIG. 4 is a block diagram illustrating a configuration of a print processing system, to which a data processing apparatus and a printing apparatus are applicable, showing the embodiment of the present invention;

FIGS. 5A and 5B show block diagrams illustrating a Web server function processing configuration in the data processing apparatus shown in FIG. 4;

15        FIG. 6 illustrates an example of a system form to which the present invention is applicable;

FIG. 7 is a flow chart showing an example of a data processing procedure by an IPP client port in accordance with the present invention;

20        FIG. 8 is a flow chart showing an example of a data processing procedure by a Web server in accordance with the present invention;

FIG. 9 is a flow chart showing an example of a data processing procedure in a print control apparatus in accordance with the present invention;

25        FIG. 10 is a flow chart showing an example of a data processing procedure in a print control apparatus

in accordance with the present invention;

FIG. 11 is a flow chart showing an example of a detailed data processing procedure corresponding to step (304) of FIG. 7;

5        FIG. 12 is a flow chart showing an example of a detailed data processing procedure by a Web server 204 corresponding to step (403) of FIG. 8;

FIG. 13 is a flow chart showing an example of a detailed data processing procedure by the Web server  
10    204 corresponding to step (407) of FIG. 8;

FIG. 14 is a block diagram illustrating a configuration of a print processing system, to which a data processing apparatus and a printing apparatus are applicable, showing an embodiment of the present  
15    invention;

FIG. 15 is a flow chart showing an example of a data processing procedure by a Web server in accordance with the present invention;

FIG. 16 is a flow chart showing an example of a  
20    data processing procedure in a print control apparatus in accordance with the present invention;

FIG. 17 illustrates a memory map of a storage medium for storing various data processing programs that are readable by a printing system to which an  
25    information processing apparatus in accordance with the present invention is applicable; and

FIG. 18 illustrates a memory map of a storage

medium for storing various data processing programs that are readable by the printing system to which the print control apparatus in accordance with the present invention is applicable.

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#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

(First embodiment)

FIG. 1 is a view illustrating a configuration of a data processing system, to which an information  
10 processing apparatus is applicable, showing an embodiment of the present invention.

In the figure, reference numerals 1101 to 1103 denote client computers (PCs) that functionally operate as Web servers and 1104 denotes a network for  
15 connecting the devices, the above-described PCs 1101, 1102 and 1103. Reference numerals 1105, 1106 and 1107 denote printers that are connected to the above-described network 1104 and are communicatable with the PCs 1101 to 1103 by a predetermined protocol (IPP).

20 FIG. 2 is a block diagram illustrating a control configuration of the PCs 1101 to 1103 shown in FIG. 1 and corresponds to a configuration of a PC that is operable by a predetermined protocol (e.g., IPP protocol). Further, the parts identical with those in  
25 FIG. 1 are denoted by the identical reference numerals.

In FIG. 2, reference numeral 13400 denotes a PC on which network device control software operates, which

corresponds to the PCs 1101 to 1103 shown in FIG. 1.

The PC 13400 is provided with a CPU 13401 for  
executing a network device control program, which is  
stored in an ROM 13402 or a hard disk (HD) 13411 or  
5 supplied from a floppy disk drive (FD) 13412, and  
collectively controls each device connected to a system  
bus 13404. Reference numeral 13403 denotes an RAM,  
which functions as a main memory, a work area or the  
like of the CPU 13401. Reference numeral 13405 denotes  
10 a keyboard controller (KBC), which controls an input of  
an instruction from a keyboard (KB) 13409, a not-shown  
pointing device or the like.

Reference numeral 13406 denotes a CRT controller  
(CRTC), which controls a display of a CRT display (CRT)  
15 13410. Reference numeral 13407 denotes a disk  
controller (DKC), which controls an access between the  
hard disk (HD) 13411 storing a boot program, various  
applications, an edit file, a user file, a network  
device control program and the like and the floppy disk  
20 controller (FD) 13412.

Reference numeral 13408 denotes a network  
interface card (NIC), which bi-directionally exchanges  
data with an agent or a network apparatus via an LAN  
11200.

25 FIG. 3 is a block diagram illustrating a control  
configuration of the printers 1105, 1106 and 1107 shown  
in FIG. 1, in which the parts identical with those in

FIG. 1 are denoted by the identical reference numerals.

In a controller unit 1001 of the printers 1105, 1106 and 1107, reference numeral 12 denotes a printer CPU (CPU). The printer CPU collectively controls  
5 accesses with various devices connected to a system bus 15 according to a control program or the like stored in a program ROM of an ROM 13 or a control program or the like stored in an external memory 14 and outputs an image signal as output information to a printer engine  
10 17 connected via an engine interface 16.

In addition, a control program or the like executable by the CPU 12 is stored in a program ROM of this ROM 13. Further, font data (including outline font data) or the like, which is used in generating the  
15 above-described output information, is stored in a font ROM of the ROM 13. Moreover, information or the like, which is utilized on a host computer 3000 in case of a printer without an external memory 14 such as a hard disk, is stored in a data ROM of the ROM 13.

20 The CPU 12 is capable of performing communication processing with the client computers 1101 to 1103 via an input unit 18 and is configured such that information or the like in the printers 1105, 1106 and 1107 can be notified to the client computers 1101 to  
25 1103. In addition, the input unit 18 is provided with a network interface function with a communication function via the Internet or the like. Moreover, the



CPU 12 is provided with a protocol analyzing unit or the like for analyzing a protocol of a print job received from the outside. The CPU 12 can be configured such that an optimal protocol is selected by the analysis of this protocol analyzing unit, thereby switchably controlling print data processing according to this embodiment and print data processing such as an ordinary TCP/IP or the like.

Reference numeral 19 denotes an RAM, which functions mainly as a main memory, a work area or the like of the CPU 12 and is configured such that a memory capacity can be expanded by an optional RAM to be connected to a not-shown extension port.

Further, the RAM 19 is used for an output information developing area, an environmental data storing area, an NVRAM or the like. Accesses of the above-described hard disk (HD) and the external memory 14 such as an IC card are controlled by a disk controller (DKC) 20. The external memory 14 is connected as an option and stores font data (including font data to be downloaded from the host computer 3000 or the like), an emulation program (including an emulation program to be downloaded from the client computers 1101 to 1103 or the like), form data (to be downloaded from the client computers 1101 to 1103) and the like.

In addition, reference numeral 1012 denotes the

above-described operation panel, in which a switch for operation, an LED indicator and the like are arranged.

In addition, the printers 1105, 1106 and 1107 may be configured such that the above-described external  
5 memory is not limited to one but may be provided at least one or more and a plurality of external memories, which store a program for interpreting printer control languages with different option font cards and language systems in addition to an built-in font, can be  
10 connected to it. Moreover, the printers may have a not-shown NVRM, in which printer mode setting information from the operation panel 1012 is stored for each user and each group.

In addition, as a printing apparatus applicable to  
15 this embodiment, there are a laser beam printer employing an electrophotographic method, an ink jet printer employing an ink jet method, a thermal printer employing a thermal transfer method and the like.

FIG. 4 is a block diagram illustrating a  
20 configuration of a print processing system, to which data processing apparatus and a printing apparatus are applicable, showing an embodiment of the present invention. The print processing system corresponds to a print processing system with which a plurality of IPP  
25 clients (print clients) can issue "Print-URI (Uniform Resource Identification) requests", which designate a URL as identification information of a job to be

printed, to an IPP printer. Further, when the plurality of IPP clients (print clients) issue "Print-URI requests", which designate a URL of a job to be printed, to the IPP printer, the printer registers the URL of the job in a job management table. When entering a print data acceptable state, the IPP printer obtains and prints print data of a URL-designated destination on the job management table 105 one after another by a Pull method. Here, the Pull method will be described in detail later.

Further, the above example has been described with reference to a URI. However, identification information for indicating a location where information to be printed (print data) exists is applicable. For example, a path for specifying a file using a position of a hierarchical structure, a serial number for identifying print data and the like are applicable.

In FIG. 4, reference numerals 101, 102 and 103 denote IPP clients (print clients as information processing apparatuses for requesting printing to an IPP printer), 104 denotes an IPP printer. The IPP clients 101, 102 and 103 and the IPP printer 104 are connected via a network (LAN) that is a predetermined communication medium. Further, it is assumed that an LAN includes a wireless LAN.

Reference numeral 105 denotes a job management table that is a management table for managing

identification information (job name) of print data  
(print job) for which a print request is made and a  
storage place in which the print data is stored by  
associating them with each other. More specifically, a  
5 "Print-URI request" to be received by the IPP printer  
104 is scheduled. Reference numeral 106 denotes a  
"print-URL request" that is sent by the IPP clients 101  
to 103 at the time of printing.

Reference numeral 107 denotes a Pull method for  
10 obtaining print data from a URL-designated destination  
designated by a "Print-URI request" if the IPP printer  
104 becomes capable of receiving print data. In  
addition, the Pull method 107 can use a protocol that  
can obtain data on the Internet such as a get method of  
15 an http protocol and a get command of an FTP protocol.

FIGS. 5A and 5B are block diagrams illustrating a  
configuration for processing a Web server function in  
the data processing apparatus shown in FIG. 4 and is an  
example of a module configuration of an IPP client  
20 (print client) for performing print using a "Print-URI  
request".

In FIG. 5A, reference numeral 201 denotes a print  
application and 202 denotes a printing system (in  
general, including a spooler, a print driver provided  
25 with a function for converting data into a command  
system that can be interpreted by a printer) that is  
usually included in an OS or the like.

Reference numeral 203 denotes an IPP client port, which receives print data, which can be processed by a printer, discharged (generated) by a printing system, registers the print data in a Web server 204 and issues  
5 a "Print-URI request" to the printer.

Reference numeral 204 denotes a Web server, which receives print data from the IPP client port 203 and stores and saves the print data in a storage device 205 such as a hard disk, records information in a print  
10 data management and returns the print data if a printer requests the print data by the Pull method (http protocol, FTP or the like).

Reference numeral 205 denotes a storage device (volatile storage device is also applicable) such as a  
15 hard disk, which saves print data passed from the Web server 204 according to a print data management table 206 of print data managed by the Web server 204. In addition, a detailed situation of management of the print data management table 206 is shown in FIG. 5B.

Reference numeral 207 denotes a Print-URI request, with which the IPP client port 203 requests the IPP printer to perform printing. Reference numeral 208 denotes a Pull method with which an IPP printer obtains print data and includes a get method of an http  
20 protocol, a get command of an ftp protocol or the like.  
25

FIG. 5B shows details of the print management table 206 of FIG. 4, in which an IP address or the like

of a printer, to which a Print-URI request should be issued, that is used when the IPP client port 203 issues the Print-URI request to a plurality of IPP printers is described. In addition, management tables  
5 as shown by 206 are managed by associating them with identification information (an IP address, an MAC address, a printer name and the like) of an IPP printer, respectively. The identification information of the IPP printer is preset management information or  
10 corresponds to extracted one of identification information of the IPP printer included in a get method or an ftp protocol.

Here, print management data shown in FIG. 5B will be described more in detail. Information written in  
15 the left column is job identification information 210 for identifying print data. A job name or the like of print data corresponding to a print instruction from a user corresponds to this. It is anticipated that the IPP client port 203 that has received a print  
20 instruction from the printing system 202, a serial number generated by the Web server 204 in association with a print job name, and the like are also applicable.

In addition, information in the right column 211 indicates a URL (reference information) associated with  
25 the above-described job identification information 210. Identification information that is utilized for specifying a file storing place (print data storing

place) equivalent to a URL is applicable. In addition, this reference information 211 is equivalent to reference information that is generated in association with received print data when the Web server 204

5 receives registration of the print data from the IPP client port according to step S403 of FIG. 8 to be described later.

FIG. 6 shows a block diagram of the case in which the module configuration shown in FIGS. 5A and 5B is  
10 applied to another system form. If each function of FIGS. 5A and 5B is applied to a system configuration shown in FIG. 6, the module functions of 201 to 203 in FIG. 5A are provided in IPP clients 601 to 603, respectively, and each module function of 204, 205, 206  
15 and 208 is provided in a Web server 606. As a flow of information, for example, a print request is sent to the Web server 606 together with print data from the IPP client 601, reference information associated with the received print data is automatically generated in  
20 the Web server 606 and the generated reference information is inputted in an IPP printer 605 or the like as a print request. Upon receiving the reference information, the IPP printer obtains print data from the Web server 606 and executes image forming  
25 processing according to the reference information.

FIG. 7 is a flow chart showing an example of a data processing procedure in the information processing

apparatus in accordance with the present invention,  
which corresponds to an operation procedure of the IPP  
client port 203 in the case in which a user uses the  
print application 201 or the like in the IPP client 101  
5 shown in FIG. 4 to perform printing. Further,  
reference numerals (301) to (306) denote respective  
steps. In addition, it is assumed that actual  
processing of each step is realized in response to a  
CPU provided in the information processing apparatus  
10 reading a program code for executing the flow chart of  
FIG. 7 stored in nonvolatile storage means such as an  
ROM, an HD or the like and executing processing  
according to the read program code.

First, when a client machine is started in step  
15 (301), the IPP client port 203 is started. When a user  
instructs printing using the print application 201 or  
the like, the instruction is converted into print data  
that a printer can process with a printer driver in the  
printing system 202 and the print data is passed to the  
20 IPP client port 203.

Then, when the IPP client port 203 receives print  
data from the printing system 202 in step (302), the  
IPP client port 203 checks whether or not the Web  
server 204 is started on the client in step (303). If  
25 the Web server 204 is not started, the IPP client port  
203 starts the Web server 204 in step (306) and shifts  
to processing of step (304). Further, a Web server may



be started in response to the start of the IPP client port 203.

On the other hand, if it is determined in step (303) that the Web server 204 is started, the IPP client port 203 shifts to the processing of step (304) and registers the print data received in step (302) in the Web server 204. Here, registering indicates processing for causing a Web server to store print data.

Next, the IPP client port 203 issues a "Print-URI request" designating a URL of the print data registered in the Web server 204 in step (304) to the IPP printer 104 in step (305) and returns to step (302) to continue the processing of step (302) and subsequent steps if print data is further passed from the printing system 202.

In this case, the printer management table 206, which is registered in association with the IPP printer 104 to which a "Print-URI request" should be issued, is referenced.

Further, the above-described IPP client port 203 ends processing in such a case in which a client system is shut down.

FIG. 11 shows an operation procedure of the IPP client port 203 in the case in which a user performs printing using the print application 201 or the like in the IPP client 101 shown in FIG. 4 and corresponds to details of step (304) of FIG. 7. Further, reference

numerals (1101) to (1108) denote respective steps.

First, upon receiving data from the printing system 202 in step (1101), the IPP client port 203 starts receiving print data in step (1102) and issues a request for obtaining a URL corresponding to the print data to a Web server in step (1103).

Then, the IPP client port 203 determines in step (1104) if the URL corresponding to the print data was successfully obtained from the Web server. If it was successfully obtained, the IPP client port 203 writes the print data received from the printing system 202 in the Web server in step (1105). Further, this writing processing is equivalent to the above-described registration processing of print data to a Web server.

On the other hand, if the URL corresponding to the print data has not been successfully obtained from the Web server in step (1104), the IPP client port 203 rejects receiving processing of data against the printing system 202 in step (1109) and shifts to step (1108) to end the processing regarding that an error has occurred. This is equivalent to processing for checking if generation processing of a URL has been normally executed.

Next, the IPP client port 203 determines in step (1106) if writing of print data received from the printing system 202 has ended, and if it has not ended, shifts the processing to step (1104) to continue

writing processing in the Web server.

On the other hand, if it is determined in step (1106) that the writing of the print data received from the printing system 202 in the Web server has ended, the IPP client port 203 performs processing for ending writing in the Web server in step (1107) and shifts to step (1108) to end the registration processing of print data in the Web server.

FIG. 8 is a flow chart showing an example of a data processing procedure in the information processing apparatus in accordance with the present invention and corresponds to a processing procedure that should be executed by the Web server 204 shown in FIGS. 5A or 6. Further, reference numerals (401) to (411) denote respective steps. In addition, it is assumed that actual processing of each step is realized in response to a CPU provided in the information processing apparatus reading a program code for executing the flow chart of FIG. 8 stored in nonvolatile storage means such as an ROM and an HD and executing processing according to the read program code.

First, if the Web server 204 is not started in step (401), the Web server 204 is started by the IPP client port 203 in step (402). Alternatively, the Web server may be started in the case in which a client system is started, or the like.

Next, when print data is registered by the IPP

client port 203 in step (403), storage (saving) of the print data in the storage device 205 or the like is executed.

FIG. 12 is a flow chart showing an example of a processing procedure in the information processing apparatus in accordance with the present invention, which corresponds to step (403) of FIG. 8 that is executed by the Web server 204 shown in FIG. 5A. Further, reference numerals (1201) to (1210) denote respective steps.

First, when a URL obtaining request is issued to the Web server 204 by the IPP client port 203 in step (1201), URL obtaining request processing is started in step (1202), a URL is determined such that it does not overlap a URL of print data in step (1203) and information of the determined URL is generated. In addition, when the URL is generated, a management table as described above in FIG. 5B is updated and generated. The URL in this context is not limited to a URL but reference information for performing pull print is applicable. For example, identification information such as a serial number can be applied.

Next, the URL is returned (notified) to the IPP client port 203 in step (1204).

In this way, print data that is requested to be printed is held in holding means (storage means), reference information for performing pull print

corresponding to the held printed data is generated and the generated reference information for performing the above-described pull print corresponding to the above-described print data is issued as a print request to a printing apparatus that is made communicatable via a predetermined communication medium. As a result, it becomes possible to easily utilize an IPP printer under a conventional network environment such as an office. Moreover, it becomes possible to utilize an IPP printer without involving work for taking trouble to register print data on a server once and obtain a URL.

Then, receipt of writing print data is started in step (1205) and a file is generated as a file of print data in step (1206).

Processing for receiving writing of print data from the IPP client port 203 and wiring the print data into a print data file is executed in step (1207).

It is checked if the processing is the end of the print data and, if it is not the end of the print data, the processing is shifted to step (1207). On the other hand, if it is the end of the print data, the Web server 204 shifts to step (1209) to perform processing for closing the print data file and ends the processing in step (1210).

Referring to the description of FIG. 8 again, in step (404), information such as a file name of the print data saved in step (403) is registered in the

print data management table 206. Next, in step (405),  
the IPP client port 203 waits for a Pull method from  
the IPP printer 104 and shifts to step (406) if the  
Pull method is one for which a request is sent first  
5 with respect to certain print data.

If a Pull method request is sent from the IPP  
printer 104 in step (405), the Web server 204 shifts to  
step (406) and receives a request of a get method of a  
Pull method. Referring to a management table as shown  
10 in FIG. 5B, if designated print data exists, the Web  
server 204 returns the print data in step (407).  
Further, if the Pull method request from the  
predetermined IPP printer 104 has been recognized on  
the Web server 204 side, the Web server 204 actually  
15 executes processing for determining from which printer  
the Pull method request was sent and returning the  
print data via a predetermined communication line  
according to an IP address or the like of a printer  
that is specified as a result of the determination.  
20 Further, since the detailed description is realized  
according to processing according to a TCP/IP protocol  
or the like that is already regarded as publicly known,  
it is omitted.

Here, details of step (407) will be described. FIG.  
25 13 is a flow chart showing an example of a data  
processing procedure in the information processing  
apparatus in accordance with the present invention,

which corresponds to step (407) of FIG. 8 of the processing procedure that should be executed by the Web server 204 shown in FIG. 5A. Further, reference numerals (1301) to (1305) denote respective steps.

5 First, when a Pull request (a request for obtaining print data corresponding to reference information) is sent from an IPP printer in step (1301), the Web server 204 recognizes an IP address or the like of the IPP printer and, at the same time, retrieves  
10 print data corresponding to a URL, which is requested by Pull-Print by the print data management table 206, in step (1302).

Next, the Web server 204 determines if the print data exists in the print data management table 206 in  
15 step (1303). If the print data corresponding to the URL exists, the Web server 204 shifts the processing to step (1304) to send the retrieved print data to a printer that issued the Pull request and shifts to step (1305) to end the processing.

20 On the other hand, if the print data does not exist in the print data management table 206 in step (1303), the Web server 204 notifies the IPP printer that issued the Pull request that a required file (print data) does not exist and shifts to step (1305)  
25 to end the processing.

Returning to the description of FIG. 8, the Web server 204 determines in step (408) if the transfer of

the print data has been completed and, if it is determined that the transfer of the print data has been completed, shifts the processing to step (409) and deletes the print data from the storage device 205.

- 5 Then, if print data that the Web server 204 manages does not remain in step (410), the Web server 204 ends the processing in step (411).

Further, as a further preferred embodiment, processing is executed such that, when it is attempted  
10 to delete print data in step (409), whether or not the print data is to be deleted is displayed as a message in a selectable form and, if a signal instructing to delete the print data is recognized according to answer information (information indicating whether the print  
15 data is deleted or not) according to the message, the print data is deleted, or if a signal instructing not to delete the print signal is recognized, the print data is associated with generated reference information (e.g., URL) and saved.

- 20 In addition, if the generated reference information is notified on this occasion, a user can execute print processing of the print data that is saved again by designating the reference information. It is anticipated that this notice is processing closed  
25 in the information processing apparatus or a notice to be executed via a network. In particular, in a form such as that in the above-described FIG. 6, if the just



described processing is executed by the Web server 606,  
a mechanism for more efficiently executing printing and  
obtaining reference information can be realized in a  
printing system utilizing an IPP printer. In addition,  
5 a control is also anticipated which includes  
information for designating in advance whether or not  
print data written after print processing ends is  
deleted in print instruction information (corresponding  
to a print request of step (301) of FIG. 7) when  
10 printing of a job is instructed.

On the other hand, if it is determined in step  
(408) that return of print data is failed, the Web  
server 204 returns to step (405) and waits for a  
request for a Pull method is sent from the IPP printer  
15 104 again.

Then, although the Web server 204 returns an error  
to a second or later Pull method with respect to the  
same predetermined print data in step (405), if a first  
Pull method is sent with respect to predetermined print  
20 data after the return of the print data is failed in  
step (408) in this way, the Web server 204 shifts to  
step (406) and returns the print data. In addition, it  
is anticipated that processing for retransferring print  
data corresponding to reference information is  
25 performed again if a second Pull method (print request)  
is sent when a predetermined time has passed after  
transfer of a first print data is failed with respect

to the same print data.

In addition, it is anticipated that a print request sent via a predetermined communication medium (network 607) is received in the Web server 606 and  
5 stored in storage means once, the Web server 606 further generates reference information for performing pull print corresponding to the held print data and the print request is executed on an IPP printer (e.g., 605) together with the reference information to establish a  
10 printing system by providing the flow chart of FIG. 8 in the system described in FIG. 6.

FIG. 9 is a flow chart showing an example of a data processing procedure in the print control apparatus in accordance with the present invention,  
15 which corresponds to a general processing procedure concerning processing for receiving the Print-URI request 207 of the IPP printer 104. Further, reference numerals (501) to (504) denote respective steps. In addition, it is assumed that actual processing of each  
20 step is realized in response to a CPU provided in a printing apparatus reading a program code for executing the flow chart of FIG. 9 stored in nonvolatile storage means such as an ROM, an HD or the like and executing processing according to the read program code.

25 First, a Print-URI receipt processing unit (not shown) is started in step (501) when a printer main body is started and waits for receipt of the Print-URI

request 207 from the IPP client port 203 of a client in step (502).

Then, when the Print-URI request 207 is issued from the IPP client port 203 of a certain client in step (503), the Print-URI receipt processing unit receives the Print-URI request 207 and registers a URL of print data, for which a Print-URI request is designated in the job management table 105 secured, on an RAM of a printer unit in step (504) and, then, returns to step (502) such that the Print-URI is received.

FIG. 10 is a flow chart showing an example of a data processing procedure in the print control apparatus in accordance with the present invention, which corresponds to a print processing procedure (also referred to as pull print) relating to the Pull method 208 of the IPP printer 104. Further, reference numerals (601) to (609) denote respective steps. In addition, it is assumed that actual processing of each step is realized in response to a CPU provided in a printing apparatus reading a program code for executing the flow chart of FIG. 10 stored in nonvolatile storage means such as an ROM, an HD or the like and executing processing according to the read program code.

First, a not-shown print processing unit (printer controller) is started in step (601) when a printer main body is started and checks in step (602) if a URL

of a job is registered in a job management table secured on an RAM of a printer unit and, if it is determined that the URL of the job is registered, shifts to step (603). Then, the print processing unit  
5 checks if an area for receiving print data exists in a storage device (e.g., RAM) of the printer and, if it is determined that there is a space for receiving even a part of the print data, shifts to step (604).

On the other hand, if it is determined in step  
10 (603) that an area for receiving the print data does not exist, the print processing unit shifts to step (602). Then, the print processing unit obtains a URL of a print object job from the job management table 105 in step (604) and issues a request for obtaining print  
15 data by a Pull method (get method) to the Web server 204 in the URL-designated destination.

Next, if the pertinent print data exists in the Web server 204, since the Web server 204 returns the print data, the print processing unit receives the  
20 print data to be returned in step (605) and saves it in the storage device of a printer (e.g., an RAM not shown in FIG. 4).

Next, in step (606), the print processing unit starts print processing of the print data saved in the  
25 storage device of the printer in step (605) and, in step (607), determines if receipt of the print data started in step (606) has normally ended and, if it is

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determined that the receipt has normally ended, shifts to processing of step (608), or if it is determined that the receipt has been failed, returns to the processing of step (602).

5       Then, the print processing unit deletes the received print data from the storage device in step (608), deletes the URL of the job from the job management table 105 in step (609) and, when the deletion processing ends, returns to step (602) to  
10       perform subsequent processing.

10       In this way, the flow chart described in FIG. 10 is realized, whereby pull print corresponding to the above-described processing of FIG. 7 is realized. In addition, as usual print processing corresponding to  
15       this pull print, there is a push print that generates print data in an information processing apparatus via a printer driver and causes a printing apparatus or a printer server to execute print processing.

20       According to the above-described embodiment, it becomes possible to establish an efficient printing system having a print job scheduling function inexpensively without starting a special purpose print server having a large scale memory or giving a server function to a printer having a large scale memory.

25       Further, it is within the scope of the present invention to establish a printing system by combining an information processing apparatus and a print control

apparatus. It is also within the scope of the present invention to configure a printer, which is capable of selecting a plurality of protocols, to select an optimal protocol in deciding a communication protocol with a host and switchably control print data processing according to this embodiment and print data processing of an ordinary TCP/IP or the like.

In addition, since each block diagram and flow chart that have been described above are realized, specifying information for specifying a place of print data for reference print is determined and prepared together with a print request. Thus, it becomes possible for a user to cause a printing apparatus having a pull print function to perform printing by a print instruction for inputting ordinary print data. (Second embodiment)

First, it is assumed that processing similar to the flow chart of FIG. 7 described in the first embodiment is also realized in a second embodiment if a print instruction is issued. The second embodiment is different from the first embodiment in that a "Print-URI request" designating a URL of print data registered in the Web server 204 in step (304) is issued to a plurality of IPP printers set in advance in the processing of step (305) in the processing of the flow chart of FIG. 7 in the second embodiment. Further, it is anticipated that the plurality of IPP printers set

in advance may be set each time a print request is issued or may be registered in advance.

In this way, the processing of the flow chart of FIG. 7 in the second embodiment is realized, whereby  
5 reference information for performing the above-described pull print corresponding to the above-described generated print data is issued to a plurality of printing apparatuses as a print request to allow the plurality of printing apparatuses to execute the pull  
10 print and it is realized to cause the plurality of printing apparatuses to execute distributed printing or multi-address printing according to an IPP printer. Further, if the distributed printing is performed, setting means is provided which sets a page range or a  
15 designated number of prints that are allocated in association with the plurality of printing apparatuses, respectively, and the distributed printing according to a distribution situation set by the setting means is realized.

20 Next, FIG. 14 will be described. FIG. 14 is a block diagram illustrating a configuration of a print processing system, to which a data processing apparatus and a printing apparatus are applicable, showing an embodiment of the present invention, which corresponds  
25 to a print processing system in which the IPP client (print client) 101 receives print requests from various clients and issues a "Print-URI request" designating a

URL of a job to be printed to a plurality of IPP printers 102 to 104, among which a printer that can process the "Print-URI request" first is capable of obtaining and printing print data with a Pull method.

- 5 The second embodiment is different from the first embodiment in that a predetermined IPP client can send a print request to a plurality of IPP printers.

In FIG. 14, reference numeral 101 denotes an IPP client (print client), 102, 103 and 104 denote an IPP printer, 105 denotes a Print-URI request that the IPP client issues at the time of printing and 106 denotes a Pull method for obtaining print data from a URL-designated destination designated by a "Print-URI request" when the IPP printer becomes available for receiving print data. In addition, since it is assumed that block diagrams of the IPP client and the IPP printer are the same as those described in the first embodiment, detailed descriptions are omitted for them here. In addition, since it is assumed that FIGS. 5A, 5B and 6 described in the first embodiment are applied to the second embodiment, their detailed descriptions are omitted.

As described in the first embodiment, as the Pull method 106, a protocol that is capable of obtaining data on the Internet such as a get method of an Http protocol or a get command of an ftp protocol can be used.



In a printing system configured as described above,  
when a Print-URI request designating a URL of print  
data registered in an information processing apparatus  
functioning as a client (the information processing  
5 apparatus of FIG. 4 or the information processing  
apparatus of the Web server 606 of FIG. 6 described in  
the first embodiment) functioning as a client is issued  
to all printers on a network, the print data is  
returned only to a printing apparatus that has issued a  
10 Pull method request first to the registered print data  
and an error is returned to the other printing  
apparatuses in response to subsequent Pull methods  
issued by the other printing apparatuses.

FIG. 15 is a flow chart showing an example of a  
15 second data processing procedure in the information  
processing apparatus in accordance with the present  
invention, which corresponds to a processing procedure  
that the Web server 204 shown in FIGS. 5A and 5B should  
execute. Further, reference numerals (1401) to (1411)  
20 denote respective steps.

First, since it is assumed that processing of  
steps (1401) to (1404) is the same as the processing of  
steps (401) to (404) described in FIG. 8, its detailed  
description is omitted here. That is, it is assumed  
25 that the job management table described in FIG. 5B is  
applied to the second embodiment.

Next, the Web server 204 waits for a Pull method

from the IPP printer 104 in step (1405) and, if a received Pull method is a Pull method that is sent for certain print data first, shifts to step (1406).

In this way, although Pull method requests are sent from the plurality of IPP printers 102 and 103 in step (1405) and subsequent steps, the Web server 204 returns information to the effect that the request is an error via a predetermined communication line in response to a second and subsequent Pull methods instead of returning print data.

Next, if a Pull method request is sent from the IPP printer 104 in step (1405), the Web server 204 shifts to step (1406), receives a request for a Pull method (get method) and, if print data consistent with designated reference information (URL or the like) exists, returns the print data via a predetermined communication line in step (1407). Further, since it is assumed that detailed processing of step (1407) in FIG. 15 is also the same as that described in FIG. 13, its detailed description is omitted.

Then, the Web server 204 determines in step (1408) if the transfer of the print data is completed and, if it is determined that the transfer of the print data is completed, shifts to step (1409) to delete the print data from the storage device 205, stops in step (1410) if print data that it manages does not remain and ends the processing in step (1411).

On the other hand, if it is determined in step (1408) that the return of the print data is failed, the Web server 204 returns to step (1405) and waits for a request for a Pull method is sent from the IPP printer 104 again.

Then, in step (1405), the Web server 204 usually returns an error to second and subsequent Pull methods as described before. However, if the return of the print data is failed in step (1408) in this way, the Web server 204 shifts to step (1406) to return the print data when a Pull method is received first after that.

Here, since it is assumed that a general processing procedure concerning processing for receiving the Print-URI request 207 of the IPP printers 102 to 104, which corresponds to the processing of the flow chart of FIG. 15, is the same as the processing described in FIG. 9 of the first embodiment, its description is omitted here.

As described above, the transmission control (step (1405), (1406) and (1407)) for transmitting print data to a printing apparatus, to which a request for print data is issued first, is realized in response to a print request being issued to a plurality of printing apparatuses. As a result, a control for not transmitting the print data to the printing apparatuses other than the print apparatus, to which the print data

is issued first, is realized.

Next, FIG. 16 will be described. FIG. 16 is a flow chart showing an example of a data processing procedure in the printing apparatus in accordance with the present invention, which corresponds to a print processing procedure relating to the Pull method 209 of the IPP printer 104. Further, reference numerals (1601) to (1610) denote respective steps.

First, a not-shown print processing unit (printer controller) is started in step (1601) when a printer main body is started and checks in step (1602) if a URL of a job is registered in a job management table secured on an RAM of a printer unit and, if it is determined that the URL of the job is registered, shifts to step (1603). Then, the print processing unit checks if an area for receiving print data exists in a storage device (e.g., RAM) of the printer and, if it is determined that there is a space for receiving even a part of the print data, shifts to step (1604).

On the other hand, if it is determined in step (1603) that an area for receiving the print data does not exist, the print processing unit shifts to step (1602). Then, in step (1604), the print processing unit issues a request for obtaining print data by a Pull method (get method) to the Web server 204 in the URL-designated destination.

Next, in step (1605), if the pertinent print data

exists in the Web server 204, since the Web server 204 returns the print data, the print processing unit determines if the print data is returned and, if it is determined that there is no data return, returns to  
5 step (1602).

On the other hand, if it is determined in step (1605) that the Web server 204 has returned an error, the print processing unit performs processing of step (1606) and subsequent steps.

10 Then, the print processing unit receives the print data from the Web server 204 in step (1606) and saves it in the storage device (e.g., a not-shown RAM) of the printer.

Next, in step (1607), the print processing unit  
15 starts print processing of the print data saved in the storage device of the printer in step (1606) and, in step (1608), determines if receipt of the print data started in step (1606) has normally ended and, if it is determined that the receipt has normally ended, shifts  
20 to processing of step (1609), or if it is determined that the receipt has been failed, returns to the processing of step (1602).

Then, the print processing unit deletes the received print data from the storage device in step  
25 (1609), deletes the URL of the job from the job management table 105 in step (1610) and, when the deletion processing ends, returns to step (1602) to

perform subsequent processing.

According to the above-described embodiment, it becomes possible to correctly select a printer that starts print processing as soon as possible without  
5 selecting a printer based on uncertain determination criteria such as how many print jobs of how large size are scheduled in a printer when selecting such a printer.

Further, it is within the scope of the present  
10 invention to establish a printing system by combining an information processing apparatus and a print control apparatus. It is also within the scope of the present invention to configure a printer, which is capable of selecting a plurality of protocols, to select an  
15 optimal protocol in deciding a communication protocol with a host and switchably control print data processing according to this embodiment and print data processing of an ordinary TCP/IP or the like.

In addition, as a further example of application,  
20 a control is also anticipated which inquires and recognizes whether or not a printing apparatus (printer) that is made communicatable via a predetermined communication line corresponds to pull print (IPP printer) before step (302) in the processing  
25 described in FIG. 7, executes a print request according to the processing of the flow chart shown in FIG. 7 if it is determined (recognized) as an IPP printer or

otherwise executes normal print processing (print  
request corresponding to push print) for directly  
inputting print data from the information processing  
apparatus into the printing apparatus. Establishment  
5 of more flexible printing system is realized by  
executing the processing.

A configuration of a data processing program  
readable by a printing system to which the print  
control apparatus in accordance with the present  
10 invention is applicable will be hereinafter described  
with reference to memory maps shown in FIGS. 17 and 18.

FIG. 17 illustrates a memory map of a storage  
medium for storing various data processing programs  
readable by a printing system to which the information  
15 processing apparatus in accordance with the present  
invention is applicable. FIG. 18 illustrates a memory  
map of a storage medium for storing various data  
processing program readable by a printing system to  
which the print control apparatus in accordance with  
20 the present invention is applicable.

Further, although not specifically shown in the  
figures, information for managing a program group to be  
stored in a storage medium, for example, version  
information and a producer may be stored and  
25 information depending on an OS or the like on the  
program reading side, for example, an icon for  
identifying and displaying a program may be stored.

Moreover, data subordinate to various programs is also managed in the above-described directory. In addition, a program for installing various programs in a computer and, if the program for installing various  
5 programs are compressed, a program for decompressing the program, and the like may be stored.

The functions shown in each flow chart in the first and the second embodiments may be carried out by a host computer according to a program that is  
10 installed from the outside. In this case, the present invention is applied even to the case in which an information group including a program is supplied to an output apparatus by a storage medium such as a CD-ROM, a flash memory and an FD or from an external storage  
15 medium via a network.

It is needless to mention that a storage medium recording a program code of software for realizing the functions of the above-described embodiments is supplied to a system or an apparatus as described above  
20 and a computer (or a CPU or an MPU) of the system or the apparatus reads and executes the program code stored in the storage medium, whereby the objects of the present invention are attained.

In this case, the program code itself read out  
25 from the storage medium realizes a new function of the present invention. Thus, the storage medium storing the program code constitutes the present invention.



As a storage medium for supplying a program code,  
for example, a floppy disk, a hard disk, an optical  
disk, a magneto-optical disk, a CD-ROM, a CD-R, a  
magnetic tape, a nonvolatile memory card, an ROM and an  
5 EEPROM can be used.

In addition, it is needless to mention that the  
present invention includes the case in which not only a  
computer executes a read out program code, but also an  
OS (operating system) or the like operating on the  
10 computer carries out a part or all of actual processing  
according to an instruction of the program code and the  
functions of the above-described embodiments are  
realized by the processing.

Moreover, it is needless to mention that the  
15 present invention includes the case in which a program  
code read out from a storage medium is written in a  
memory provided in a function extended board inserted  
in a computer or a function extended unit connected to  
the computer and, then, a CPU or the like provided in  
20 the function extended board or the function extended  
unit carries out a part or all of actual processing  
according to an instruction from the program code and  
the functions of the above-described embodiments are  
realized by the processing.

25 As described above, according to the present  
invention, even if an IPP printer exists in the  
conventional network printing environment, it becomes

possible to sufficiently utilize a function of the printer under a local network environment such as an office, which makes the printer convenience for use.

In addition, an IPP printer can be utilized in  
5 such a case in which reference information for  
specifying a storing place of print data such as a URL  
is not obtained or reference information corresponding  
to desired print data is unknown.

Thus, according to the present invention, an  
10 effect that convenience of use of an IPP printer is  
remarkably improved is realized.